

REMARKS

Claims 1-32 are pending in the above-captioned application. Claims 15-32 were previously withdrawn. Claims 33 and 34 have been cancelled. Claims 1 and 7 have been amended. Claims 1 and 7 are in independent form.

Claim Rejections - 35 U.S.C. §102

2-3. Claims 1, 4, 6-9, 12, 14, and 33 stand rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent 5,924,865 to Quinn ("the '865 reference"). Applicant respectfully traverses the rejection.

Applicant has cancelled claim 33.

Claim 1, as amended, includes the limitation of "a torque transfer arrangement for transferring torque generated by the turbine to a tool with a shaft portion having a non-circular cross-section symmetrical to the axis of rotation, the torque transfer arrangement including a locking socket for receiving the shaft portion and having a complementary cross-section symmetrical to the axis of rotation for locking the shaft portion against rotation in the socket while permitting axial insertion of the shaft portion into the locking socket, the locking socket being connected to the turbine for rotation therewith."

The '865 reference does not disclose a tool with a shaft portion that has a non-circular cross-section symmetrical to an axis of rotation of the tool and a locking socket for receiving the shaft portion of the tool that has a complementary cross-section symmetrical to the axis of rotation of the tool, as specifically required by claim 1 of the above-captioned application. In the '865 reference, a bur 15 has a shaft 17 with an axially extending flat 19. An axis of rotation of the bur 15 extends longitudinally along the axial length of the shaft 17. Thus, it is clear that the axially extending flat 19 creates a cross-section of the shaft 17 that is not symmetrical to the axis of rotation. Therefore, claim 1 is allowable.

Further, the '865 reference discloses a locking socket including a leaf spring 56, a retainer key 57, and a flexible arm 65 with an inwardly directed finger 77 to rotationally fix the bur 15 with respect to a bur tube 41. The leaf spring 56, retainer key 57, and flexible arm 65 are

shaped complementary to the shaft 17 and the axially extending flat 19. Because the axially extending flat 19 creates a cross-section of the shaft 17 that is not symmetrical to the axis of rotation, it follows that the leaf spring 56, retainer key 57, and flexible arm 65 create a complementary cross-section of the bur tube 41 that is not symmetrical to the axis of rotation.

This feature of the cross-section of a shaft portion 82 being non-circular and symmetrical to an axis of rotation in the above-captioned application is not found anywhere in the cited art. This feature is important for turbine driven, highspeed handpieces. Any locking shapes which are not symmetrical to the axis of rotation would result in vibration of the handpiece and bur upon rotation of the bur. At the high rotation speeds of turbine handpieces this would be uncomfortable for the user, and would also make it difficult to perform precision cuts with the bur. The vibrations would also create stress in the handpiece, especially the bearings and the bur retaining mechanism, which would reduce the service life of the handpiece.

Claims 4 and 6 depend from claim 1 and, as such, are construed to incorporate by reference all the limitations of the claim to which they refer, *see* 35 U.S.C. §112, fourth paragraph. Therefore, claims 4 and 6 are allowable.

Claim 7, as amended, claims a torque transfer arrangement having the limitation of "a turbine for rotatably driving a burr about an axis of rotation, the burr having a burr shaft with a shaft portion having a non-circular cross-section symmetrical to the axis of rotation and the turbine having an axial tool bore for receiving the burr shaft, the torque transfer arrangement being characterized in that it includes a locking socket with an axial bore for receiving the shaft portion of the burr shaft, the locking socket being connectable with the turbine for rotation therewith; and a torque transfer member connected with the locking socket, the torque transfer member having a cross-section complementary to the shaft portion and symmetrical to the axis of rotation for locking the shaft portion against rotation relative to the locking socket."

The '865 reference does not disclose a burr shaft with a shaft portion that has a non-circular cross-section symmetrical to an axis of rotation of the burr shaft and a locking socket for receiving the shaft portion of the burr shaft that has a cross-section complementary to the shaft portion and symmetrical to the axis of rotation of the burr

shaft, as specifically required by claim 7 of the above-captioned application. In the '865 reference, a bur 15 has a shaft 17 with an axially extending flat 19. An axis of rotation of the bur 15 extends longitudinally along the axial length of the shaft 17. Thus, it is clear that the axially extending flat 19 creates a cross-section of the shaft 17 that is not symmetrical to the axis of rotation. Therefore, claim 7 is allowable.

Further, the '865 reference discloses a locking socket including a leaf spring 56, a retainer key 57, and a flexible arm 65 with an inwardly directed finger 77 to rotationally fix the bur 15 with respect to a bur tube 41. The leaf spring 56, retainer key 57, and flexible arm 65 are shaped complementary to the shaft 17 and the axially extending flat 19. Because the axially extending flat 19 creates a cross-section of the shaft 17 that is not symmetrical to the axis of rotation, it follows that the leaf spring 56, retainer key 57, and flexible arm 65 create a complementary cross-section of the bur tube 41 that is not symmetrical to the axis of rotation.

Claims 8, 9, 12, and 14 depend from claim 7 and, as such, are construed to incorporate by reference all the limitations of the claim to which they refer, *see* 35 U.S.C. §112, fourth paragraph. Therefore, claims 8, 9, 12, and 14 are allowable.

Therefore, Applicant respectfully requests that the rejection of claims 1, 4, 6-9, 12, 14, and 33 under 35 U.S.C. §102(b) as being anticipated by the '865 reference be withdrawn.

Claim Rejections – 35 U.S.C. §103

4-5. Claims 2 and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the '865 reference in view of U.S. Patent Application Publication 2004/0161723 to Helfenbein ("the '723 reference"). Applicant respectfully traverses the rejection.

The '723 reference discloses a handpiece 1 for a surgical or dental tool 3, which can be inserted through an insertion hole 14 into a tool holder 2. A drive gear 9 in the handpiece 1 transmits torque to the tool 3. Positive torque transmission occurs in a region 8 between a sleeve-like extension 11 of the drive gear 9 and the shaft of the tool 3. The shaft of the tool 3 has a bulge 10 and the inner contour of the sleeve-like extension 11 corresponds to the outer contour of the bulge 10.

Claim 2 of the above-captioned application includes the limitation of "the locking socket is integrated into the turbine and is an enlarged portion of the tool bore for receiving a tool with a shaft portion in the form of a radially enlarged locking boss having a diameter larger than a diameter of the shaft of the tool."

Claim 2 depends from claim 1 and, as such, is construed to incorporate by reference all the limitations of the claim to which it refers, *see* 35 U.S.C. §112, fourth paragraph. Therefore, claim 2 is allowable.

Claim 10 of the above-captioned application includes the limitation of "the locking socket is incorporated into the turbine and is an enlarged portion of the tool bore for receiving a shaft portion which is a locking boss on the burr shaft having a diameter larger than the diameter of the burr shaft."

Claim 10 depends from claim 7 and, as such, is construed to incorporate by reference all the limitations of the claim to which it refers, *see* 35 U.S.C. §112, fourth paragraph. Therefore, claim 10 is allowable.

Further, the '723 reference does not provide any teaching, suggestion, or motivation for a locking socket integrated into a turbine since the '723 reference is directed to gear driven handpieces and nowhere refers to any air turbine in the handpiece. More importantly, the '723 reference is clearly directed to a torque transfer by friction fit (positive torque transmission) and does in no way whatsoever describe or even suggest a bur shaft or locking socket with a non-circular cross-section which is symmetrical to the axis of rotation, in other words, a non-positive torque transmission. Thus, replacing the leaf spring 56, retainer key 57, and flexible arm 65 to rotationally fix the bur 15 with respect to the bur tube 41 in the '865 reference with the friction fit engagement between the sleeve-like extension 11 and the bulge 10 of the '723 reference does not provide any teaching, suggestion, or motivation for a locking socket for receiving a radially enlarged locking boss on a shaft of a tool.

Therefore, Applicant respectfully requests that the rejection of claims 2 and 10 under 35 U.S.C. §103(a) as being unpatentable over the '865 reference in view of the '723 reference be withdrawn.

6. Claims 3, 11, and 34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the '865 reference in view of U.S. Patent 6,305,935 to Cardarelli ("the '935 reference"). Applicant respectfully traverses the rejection.

Applicant has cancelled claim 34.

Claim 3 of the above-captioned application includes the limitation of "the locking socket is constructed for receiving a shaft portion of triangular cross-section, the locking socket having cross-section complementary to that of the shaft portion."

Claim 3 depends from claim 1 and, as such, is construed to incorporate by reference all the limitations of the claim to which it refers, *see* 35 U.S.C. §112, fourth paragraph. Therefore, claim 3 is allowable.

Claim 11 of the above-captioned application includes the limitation of "the locking socket has a cross-section complementary to a shaft portion of triangular cross-section."

Claim 11 depends from claim 7 and, as such, is construed to incorporate by reference all the limitations of the claim to which it refers, *see* 35 U.S.C. §112, fourth paragraph. Therefore, claim 11 is allowable.

The Examiner suggests that "it would also have been obvious to modify Quinn's locking socket's surface to be triangular so that it can complementarily engage with the modified triangular shaft." Applicant respectfully disagrees. Neither the '865 reference nor the '935 reference disclose a locking socket having a cross-section complementary to a shaft portion of triangular cross-section. The '865 reference discloses the bur tube 41 for receiving the shaft 17 with the axially extending flat 19. The '935 reference discloses a mandrel 45 having an axis pole 71 defining a chamber 73 therein. The chamber 73 has a flat luted surface 72 on one side. While the '935 reference does disclose a bur shaft "made in a triangular, rectangular, hexagonal or some other non-rounded shape", the '935 reference clearly does not disclose the chamber 73 of the axis pole 71 having a triangular cross-section. Thus, it appears that the '935 reference intended to use the same chamber 73 of the axis pole 71 for bur shafts of any cross-section.

Further, the '935 reference does not disclose a locking socket having a cross-section complementary to a shaft portion of triangular cross-section that is symmetrical to an axis of rotation. In the '935 reference, a bur member 24 has a top shaft section 56 with a flat surface 61 extending along part of its length. The flat surface 61 creates a cross-section of the bur member 24 that is not symmetrical to the axis of rotation. The flat surface 61 juxtaposes along the lute surface 72 of the chamber 73, to prevent slippage of the bur member 24 while it is engaged within the chamber 73. It follows that the lute surface 72 creates a cross-section of the chamber 73 complementary to the bur member 24 that is not symmetrical to the axis of rotation.

Thus, the cited references do not provide any teaching, suggestion, or motivation for a locking socket that is constructed for receiving a shaft portion of triangular cross-section, the locking socket having a cross-section complementary to that of the shaft portion. As a result, Applicant contends that the invention set forth in claims 3 and 11 of the above-captioned application would not have been obvious to one skilled in the art at the time of invention.

Therefore, Applicant respectfully requests that the rejection of claims 3, 11, and 34 under 35 U.S.C. §103(a) as being unpatentable over the '865 reference in view of the '935 reference be withdrawn.

7. Claims 5 and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the '865 reference. Applicant respectfully traverses the rejection.

Claim 5 depends from claim 1 and, as such, is construed to incorporate by reference all the limitations of the claim to which it refers, *see* 35 U.S.C. §112, fourth paragraph. Therefore, claim 5 is allowable.

Claim 13 depends from claim 7 and, as such, is construed to incorporate by reference all the limitations of the claim to which it refers, *see* 35 U.S.C. §112, fourth paragraph. Therefore, claim 13 is allowable.

Therefore, Applicant respectfully requests that the rejection of claims 5 and 13 under 35 U.S.C. §103(a) as being unpatentable over the '865 reference be withdrawn.

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It is respectfully submitted that this patent application is in condition for allowance, which allowance is respectfully solicited. If the Examiner has any questions regarding this amendment or the patent application, the Examiner is invited to contact the undersigned.

Respectfully submitted,



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